

To: Bill Griffing, Head of ES&H Section

From: Bruce Baller, Manager of NuMI Technical Components

The purpose of this memo is to document a meeting held on February 5, 2002 to discuss safety issues relating to the potential installation of quadrupole magnets in the NuMI carrier tunnel region between the Main Injector NuMI stub addition and the NuMI pre-target enclosure. Other associated equipment is likely to include trim elements, beam position detectors, loss monitors, and vacuum ion pumps.

I request that Jim Priest and you sign this memo to indicate your acceptance of the "points of consensus" below. The NuMI project requires this interim acceptance in order to meet our aggressive schedule for a laboratory decision in early April to install beam line devices in this region.

Bob Ducar described the general conditions of the carrier tunnel. The carrier tunnel is 412 feet in length at a 15.79% slope. The upstream end of the tunnel is constructed of 6 foot interior diameter round concrete pipe while the downstream end was excavated by drill and blast methods. The shape of the drill and blast area is irregular with a minimum height of 6 feet above finished floor. Outfitting plans call for installation of a 12 inch diameter beam pipe, two electrical conduits, supply and return LCW pipes, two conduits for total loss monitors, and 3/4" lines for nitrogen, compressed air and loss monitor gas. The area is not designed for human occupancy given the lack of lights or ventilation. A solid CMU wall is planned at the interface of the tunnel and pre-target. The upstream end will be fenced off to preclude access. It was generally understood that the carrier tunnel area, as presently planned, would be considered a "Permit Required Confined Space".

General discussion ensued. Specific topics included fire protection, ventilation, access, magnet installation, safety interlocks, and radiation issues. Several **points of consensus** were reached:

1. If at all possible and reasonable, necessary steps should be taken so as to achieve characterization of the area as a "Non-Permit Confined Space" (ref. FESHM Chapter 5063). [Limited egress and distance from the safe pre-target passageway preclude designation of the carrier tunnel as one for continuous occupancy. Characterization of the area as a Permit Required Confined Space would significantly impair installation and maintenance activities.]
2. There will be provision for permanent and continuous air circulation, if air activation levels indicate this is possible. [A necessary aspect of achieving "Non-Permit" status and appropriate environmental conditions for the installed equipment. See related action item below.]
3. The CMU wall at the upstream end of the pre-target enclosure will be installed as planned
4. An additional CMU wall will be installed upstream of planned quadrupole magnets
5. Doors will be installed in the aforementioned CMU walls. [A necessary aspect of achieving "Non-Permit" status.]

6. A fan for circulating air through the carrier tunnel will be installed in the CMU wall at the upstream end of the pre-target enclosure
7. If radiation levels show this to be reasonable, access to the downstream portion of the carrier tunnel is desired while Main Injector is operational. [See related action item below.]
8. Heat sensing wire protection (Protectawire) would be extended into the carrier tunnel region to areas of quadrupole magnet installation. Fire annunciation (strobes and speakers) needs to be extended into the carrier tunnel to warn workers. This will require two annunciators, one near each magnet.
9. The VESDA or other early warning detection (beam or flame detector) may need to be extended to cover the location of the quadrupole magnets depending on final design
10. The Radiation Safety System would be modified to create two mini-loops for the carrier tunnel region
11. Lights (some being on emergency circuits) and electrical service outlets will be installed as necessary

Provision for circulating air assumes drawing air from the Main Injector enclosure at 1000 to 2000 cfm. (This calculates conservatively to 4 to 8 air changes per hour.) Fire and smoke dampers would be provided at the CMU walls with connection to the Target fire detection system. The fan at EAV-1 would be increased in horsepower to handle the additional airflow from the carrier tunnel enclosure.

Action Items:

1. Activated air release rates at EAV-1 need to be calculated to assure the rates are within limits. The calculation should cover a range of 1000 to 2000 additional cfm from the carrier tunnel in addition to the planned 900 cfm from the pre-target area.
2. With the Main Injector running and NuMI critical devices off, determine the most upstream position for a boundary wall in the carrier tunnel that would allow controlled occupancy (i.e. <5 mrem/hr) of the downstream area of the carrier tunnel. [It is thought that this will most likely require a MARS run.]
3. Confer with FESS Engineering (Lee Hammond) to determine if proposed changes to the ventilation system will adversely affect the current ventilation design for the Pre-Target enclosure and Target Hall.

Minutes drafted by Bob Ducar

c. Sam Childress
Craig Moore
Dixon Bogert
Mike Andrews
Lee Hammond
Elaine McCluskey